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New biodegradable microbial polyester copolymers - contg. 3-hydroxy-butyrate, 3-hydroxy-valerate, 3 hydroxy-propionate and 5-hydroxy-valerate units

C91-100826 R(AT BE DE DK FR GB IT NL)

New random copolymers (I) have a wt.-av. mol wt. (Mw) of 10,000-2,500,000 and comprise 50-97 mole % 3-hydroxybutyrate (3HB) units, 1-25 mole % 3-hydroxyvalerate (3HV) units, 1-15 mole % 3-hydroxypropionate (3HP) and 1-10 mole % 5-hydroxyvalerate (5HV) units.

A(5-E2, 9-A) BC(4-C3D) D(5-C, 9-C5)

USE/ADVANTAGE

(I) are biodegradable and biocompatible polymers with lower crystallinity and better moulding properties than poly-3-hydroxybutyrate, e.g. with satisfactory flexibility, m.pts. of 120-130°C and sufficient thermal stability to allow heat sterilisation.

They may be used in the mfr. of biomedical materials (e.g. sutures and bone-setting materials), slow-release pharmaceutical and agricultural compsns., sanitary articles, diapers, fishing nets, packaging etc.

PREPARATION

(I) are produced by culturing a microorganism (esp. an Alcaligenes sp.) under N and/or P limitation in the presence of δ-valerolactone (DVL), 1,5-pentanediol or a mono-or dicarboxylate ester of 1,5-pentanediol, pref. at 20-40°C and pH 6-10.

EXAMPLE

A. eutrophus ATCC 17699 was cultured in 2000 ml of a medium contg. 4 g/l $(NH_4)_2SO_4$, 8 g/l K_2HPO_4, 1.2 g/l KH_2PO_4, 0.5 g/l NaCl, 2.4 g/l $MgSO_4$, 20 ml/l mineral salt soln. and 10 g/l fructose at 30-35°C and pH 7-8 for 20hr. After adding 110 g/l DVL, cultivation was continued for 60hr.

The broth was centrifuged and the pellet dried to give 69 g/l of dry cells contg. 33% of a copolymer (Mw = 420,000) contg. 92% 3HB, 2% 3HV, 5% 3HP and 1% 5HV units. (15pp367DAHDwgNo0/0).

(E) ISR: No Search Report